Sequence Listing

<110> Sidhu, Sachdev S.
Weiss, Gregory A.
Wells, James A.

<120> IMPROVEMENTS IN PHAGE DISPLAY

<130> P1581R2

<140> US 09/380,447
<141> 1999-09-01

<150> US 60/134,870
<151> 1999-05-19

<150> US 60/133,296
<151> 1999-05-10

<150> US 60/103,514
<151> 1998-10-08

<150> US 60/094,291
<151> 1998-07-27

<150> PCT/USUS99/16596
<151> 1999-07-22

<160> 287

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<223> Synthetic coat protein

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<400> 1

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				20				25						30	
Glu	Thr	Ala	Ser	Ala	Gln	Leu	Ser	Asn	Phe	Ala	Ala	Lys	Ala	Pro	
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Asp	Asp	Gly	Glu	Ala											
				50											

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Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val
20 25 30

Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe
35 40 45

Thr Ser Lys Ala Ser
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Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val
20 25 30

Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe
35 40 45

Thr Ser Lys Ala Ser
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<223> coat protein VIII

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Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asp Ser Leu Gln
1 5 10 15

Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val
20 25 30

Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe
35 40 45

Thr Ser Lys Ala Ser
50

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<222> 1-50
<223> coat protein VIII

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1 5 10 15

Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val
20 25 30

Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe
35 40 45

Ala Ser Lys Ala Ser
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<222> 1-50
<223> coat protein VIII

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Asp Asp Ala Thr Ser Gln Ala Lys Ala Ala Phe Asp Ser Leu Thr
1 5 10 15

Ala Gln Ala Thr Glu Met Ser Gly Tyr Ala Trp Ala Leu Val Val
20 25 30

Leu Val Val Gly Ala Thr Val Gly Ile Lys Leu Phe Lys Lys Phe
35 40 45

Val Ser Arg Ala Ser
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<222> 1-50
<223> coat protein VIII

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Ser Thr Ala Thr Ser Tyr Ala Thr Glu Ala Met Asn Ser Leu Lys
1 5 10 15

Thr Gln Ala Thr Asp Leu Ile Asp Gln Thr Trp Pro Val Val Thr
20 25 30

Ser Val Ala Val Ala Gly Leu Ala Ile Arg Leu Phe Lys Lys Phe
35 40 45

Ser Ser Lys Ala Val
50

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<220>
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<222> 1-50
<223> coat protein VIII

<400> 8
Asn Ala Ala Thr Asn Tyr Ala Thr Glu Ala Met Asp Ser Leu Lys
1 5 10 15

Thr Gln Ala Ile Asp Leu Ile Ser Gln Thr Trp Pro Val Val Thr
20 25 30

Thr Val Val Val Ala Gly Leu Val Ile Arg Leu Phe Lys Lys Phe
35 40 45

Ser Ser Lys Ala Val
50

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accagatgca taagccgagg cggaaaacat catcg 35

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<400> 11
ttttctagac aggcctccca ccagatgcat aagccgaggc ggaaaacatc 50

atcgtc 56

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aggtgtcgtg g 61

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<210> 18
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caagcctcag cgaccgaatg atgaggttat gcgtgggcga tg 42

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cgctgggcga tggttgtttg atgagtcggc gcaactatcg gt 42

<210> 20
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<220>
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<400> 20
gcaactatcg gtatcaagtg atgaaagaaa ttcacctcga aa 42

<210> 21
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<220>
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<220>
<221> unsure
<222> 20, 22, 26, 28, 31, 34, 38, 41, 44, 47
<223> unknown base

<400> 21
ggatccggga gctccagcrn tnasrntnas nasnycrntr narntrnttt 50

taactccctg caagcc 66

<210> 22
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<220>
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<220>
<221> unsure
<222> 19, 22, 26, 28, 31, 35, 38, 41, 44, 46
<223> unknown base

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tatcggttat gcgtgg 66

<210> 23
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<222> 19, 22, 25, 28, 31, 35, 38, 41, 44, 47
<223> unknown base

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tcattgtcgg cgcaactatc 70

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<222> 19, 22, 25, 28, 31, 34, 37-38, 40-41, 43-44
<223> unknown base

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gtttaagaaa ttcacc 66

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<220>
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<222> 19-20, 22-23, 31-32, 34-35, 37-38, 43-44, 46-47
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ataaaccgat acaattaaag gc 72

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<211> 66
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tatcggttat gcgtgg 66

<210> 27
<211> 36
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<400> 27
ccgacaccct ccaatgctga ggaaacacaa cagaaa 36

<210> 28
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<211> 75
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<400> 29
aactacgggc tgctcgcttg cttcaggaag gacatggaca aggtcgagac 50

attcctggct atcgtgcagt gccgc 75

<210> 30
<211> 57
<212> DNA
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<400> 30
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ccgctct 57

<210> 31
<211> 42
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<400> 31
ggtggaggat ccgggagctg atgagccgag ggtgacgatc cc 42

<210> 32
<211> 46
<212> DNA
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<210> 33
<211> 50
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1 5 10 15

Ser Val Asp Val Asp Asn Asn Trp Ile Trp Ala Val Gly Ile Ile
20 25 30

Tyr Met Leu Leu Val Glu Ala Ser Pro Trp Ala Ala Lys Ala Pro
35 40 45

Asp Asp Gly Glu Ala
50

<210> 34
<211> 93
<212> DNA

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cvvcvvcvvc vvcvvcvvcg gcggtgccga gggtgacgat ccc 93

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c 51

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<211> 67
<212> DNA
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ccgagggtga cgatccc 67

<210> 37
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<213> Artificial sequence

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vcvvcvvcvv cvvcgccgag ggtgacgatc cc 82

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<211> 97
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<400> 38
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vcvvcvvcvv cvvcvvcvvc vvcvvcvvcg ccgagggtga cgatccc 97

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<211> 112
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ggtgacgatc cc 112

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tatcggttat gcgtgg 66

<210> 41
<211> 66
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cattgtcggc gcaact 66

<210> 42
<211> 33
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<213> Artificial sequence

<220>
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<400> 42
gcaaaagcgg cctataacgc tcttgaggat att 33

<210> 43
<211> 33
<212> DNA
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<220>
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<400> 43
tatgaggctc ttgaggccat tgctactaac tat 33

<210> 44
<211> 33
<212> DNA
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<220>
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<400> 44
gaggctcttg aggattcagc tactaactat atc 33

<210> 45
<211> 66
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<400> 45
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tatcggttat gcgtgg 66

<210> 46
<211> 66
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<400> 46
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cgagggtgac gatccc 66

<210> 47

<211> 60
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<400> 47
cccgcaaaag cggcctttaa cgctctgcaa gccattgcga ccgaatatat 50

cggttatgcg 60

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cattgtcggc gcaact 66

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gggagctcca gcgatgagag tgagaagttc gct 33

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agctccagcg ataagggtga gaagttcgct aga 33

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agcgataaga gtgaggattt cgctagagat gct 33

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agtgagaagt tcgctaaaga tgcttttaac tcc 33

<210> 56
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cccgcaaaag cggcctttga ggctcttgag gat 33

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gcaaaagcgg cctataaacg ctcttgagga tatt 34

<210> 59
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<400> 59
aaagcggcct atgagtccct tgaggatatt gct 33

<210> 60
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<400> 60
gcctatgagg ctcttcaaga tattgctact aac 33

<210> 61
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tatgaggctc ttgaggccat tgctactaac tat 33

<210> 62
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<400> 62
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<400> 63
gaggatattg ctactgaata tatcggttat gcg 33

<210> 64
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<210> 66
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<210> 67
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<400> 67
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<210> 73
<211> 33
<212> DNA
<213> Artificial sequence

<220>
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<400> 73
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<210> 74
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gcaaaagcgg cctataactc ccttgaggat attgct 36

<210> 75
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<400> 75
gcaaaagcgg cctataacgc tcttgaggat tcagctacta actatatc 48

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<211> 60
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<223> mutagenic oligonucleotide

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cccgcaaaag cggcctatga gtcccttgag gattcagcta ctaactatat 50

cggttatgcg 60

<210> 77
<211> 48
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<210> 78
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> peptide linker

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Gln Ser Gly Gly Gly Ser Gly Ser Ser Ser
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<210> 79
<211> 5
<212> PRT
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<220>
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<400> 79
Gly Gly Arg Pro Val
1 5

<210> 80
<211> 34
<212> DNA
<213> Artificial sequence

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<223> linker oligonucleotide

<400> 80
cagagcggtg gaggatccgg gagctccaga gggt 34

<210> 81
<211> 39

<212> DNA
<213> Artificial sequence

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<400> 81
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<210> 82
<211> 12
<212> PRT
<213> Artificial sequence

<220>
<223> peptide flag

<400> 82
Met Ala Asp Pro Asn Arg Phe Arg Gly Lys Asp Leu
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<210> 83
<211> 60
<212> DNA
<213> Artificial sequence

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<400> 83
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ccatcaccat 60

<210> 84
<211> 60
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<213> Artificial sequence

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taaggcgcca 60

<210> 85
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<400> 85
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<210> 89
<211> 45
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<210> 90
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<400> 90
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<210> 91
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tgcg 54

<210> 92
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<400> 92
acctcgaaag caagcggtgg cggtggtggc ggtggtggcc atcaccatca 50

ccatgcg 57

<210> 93
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<400> 93
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tcaccatgcg 60

<210> 94
<211> 63
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 94
acctcgaaag caagcggtgg cggtggcggt ggtggcggtg gtggccatca 50

ccatcaccat gcg 63

<210> 95
<211> 69
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 95
acctcgaaag caagcggtgg cggtggcggt ggcggtggtg gcggtggtgg 50

ccatcaccat caccatgcg 69

<210> 96
<211> 75
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 96
acctcgaaag caagcggtgg tggtggcggt ggcggtggcg gtggtggcgg 50

tggtggccat caccatcacc atgcg 75

<210> 97
<211> 81
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 97
acctcgaaag caagcggcgg cggtggtggt ggcggtggcg gtggcggtgg 50

tggcggtggt ggccatcacc atcaccatgc g 81

<210> 98
<211> 87
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 98
acctcgaaag caagcggcgg tggcggcggt ggtggtggcg gtggcggtgg 50

cggtggtggc ggtggtggcc atcaccatca ccatgcg 87

<210> 99

<211> 93
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 99
acctcgaaag caagcggtgg tggcggtggc ggcggtggtg gtggcggtgg 50

cggtggcggt ggtggcggtg gtggccatca ccatcaccat gcg 93

<210> 100
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> zone library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35
<223> unknown base

<400> 100
caaggaccat agattatgnn snnsnnsnns nnsnnsaagt ttctgaaagt 50

ttttgttttt 60

<210> 101
<211> 57
<212> DNA
<213> Artificial sequence

<220>
<223> zone library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35
<223> unknown base

<400> 101
attatgagca agagcactnn snnsnnsnns nnsnnsgttt ttgttttttc 50

tgttgat 57

<210> 102
<211> 69
<212> DNA
<213> Artificial sequence

<220>
<223> zone library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44,

46-47
<223> unknown base

<400> 102
ttcaaaaagt ttctgaaann snnsnnsnns nnsnnsnnsn nsnnsnnsaa 50

ttggatttgg gctgtcggt 69

<210> 103
<211> 69
<212> DNA
<213> Artificial sequence

<220>
<223> zone library

<220>
<221> unsure
<222> 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44, 46-47,

49-50
<223> unknown base

<400> 103
gttttttctg ttgatgttga tnnsnnsnns nnsnnsnnsn nsnnsnnsnn 50

sgcggctgat gcattccca 69

<210> 104
<211> 72
<212> DNA
<213> Artificial sequence

<220>
<223> zone library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44,

46-47
<223> unknown base

<400> 104
tgggctgtcg gtattattnn snnsnnsnns nnsnnsnnsn nsnnsnnsgc 50

tgctaaggcg ccagacgatg gt 72

<210> 105
<211> 69

<212> DNA
<213> Artificial sequence

<220>
<223> zone library

<220>
<221> unsure
<222> 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44, 46-47,

49-50
<223> unknown base

<400> 105
agcgctcagc tgagcaactt cnnsnnsnns nnsnnsnnsn nsnnsnnsnn 50

sgcggctgat gcattccca 69

<210> 106
<211> 81
<212> DNA
<213> Artificial sequence

<220>
<223> linker library

<400> 106
gatggtgaag ctgcggctvv cvvcvvcvvc vvcvvcvvcv vcvvcvvcvv 50

cvvcvvcvvc gatgcattcc caactatacc a 81

<210> 107
<211> 96
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<220>
<221> unsure
<222> 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 55, 58, 61, 64, 67
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70, 73, 76
<223> unknown base

<400> 107
actttcaaaa agtttctgaa anwtnktnwt nytnytnktn wtnwtnwtnw 50

tnwtnkgnyt nkgnytnwcn ktnwtnwtga gactgctagc gctcag 96

<210> 108
<211> 21
<212> DNA
<213> Artificial sequence

<220>
<223> synthetic oligonucleotide

<400> 108
caccatcacc atcaccatgc g 21

<210> 109
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 109
gcctgggagg agaacatcga cagcgccccc 30

<210> 110
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 110
Ala Trp Glu Glu Asn Ile Asp Ser Ala Pro
1 5 10

<210> 111
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 111
cagtacggga cgccggacac cgacaccgac 30

<210> 112
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 112
Gln Tyr Gly Thr Pro Asp Thr Asp Thr Asp
1 5 10

<210> 113
<211> 30

<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 113
acggggtggt tggaggggcc cgacaccccc 30

<210> 114
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 114
Thr Gly Trp Leu Glu Gly Pro Asp Thr Pro
1 5 10

<210> 115
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 115
ctcatgggcc ccggcgcgga cggc 24

<210> 116
<211> 8
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 116
Leu Met Gly Pro Gly Ala Asp Gly
1 5

<210> 117
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 117
cacgactcgg tcccgagcaa cggc 24

<210> 118
<211> 8
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 118
His Asp Ser Val Pro Ser Asn Gly
1 5

<210> 119
<211> 120
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 119
atgagcaaga gcactttcaa aaagtttctg aaagagactg ctagcgctca 50

gctgagcaac ttcgctgcta aggcgccaga cgatggtgaa gctgcggctc 100

accatcacca tcaccatgcg 120

<210> 120
<211> 40
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 120
Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Glu Thr Ala Ser
1 5 10 15

Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro Asp Asp Gly Glu
20 25 30

Ala Ala Ala His His His His His His Ala
35 40

<210> 121
<211> 41
<212> PRT
<213> Artificial sequence

<220>
<223> M13 coat protein VIII library

<220>
<221> unsure

<222> 12
<223> unknown amino acid

<400> 121
Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Xaa Glu Thr Ala
1 5 10 15

Ser Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro Asp Asp Gly
20 25 30

Glu Ala Ala Ala His His His His His His Ala
35 40

<210> 122
<211> 51
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 122
gctgcggctg atgcatctgg tagcgtctag agccaccatc accatcacca 50

t 51

<210> 123
<211> 54
<212> PRT
<213> Artificial sequence

<220>
<223> P1-1 plus linker

<400> 123
Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Val Phe Val Phe
1 5 10 15

Ser Val Asp Val Asp Asn Asn Trp Ile Trp Ala Val Gly Ile Ile
20 25 30

Glu Thr Ala Ser Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro
35 40 45

Asp Asp Gly Glu Ala Ala Ala Asp Ala
50

<210> 124
<211> 150
<212> DNA
<213> Artificial sequence

<220>
<223> M13 coat protein VIII variant

<400> 124
atgagcaaga gcactttcaa aaagtttctg aaagtttttg ttttttctgt 50

tgatgttgat aataattgga tttgggctgt cggtattatt tacatgctcc 100

tcgtggaggc gtcgccctgg gctgctaagg cgccagacga tggtgaagct 150

<210> 125
<211> 48
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29
<223> unknown base

<400> 125
ttcacctcga aagcaagcnn snnsnnsnns caccatcacc atcaccat 48

<210> 126
<211> 51
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32
<223> unknown base

<400> 126
ttcacctcga aagcaagcnn snnsnnsnns nnscaccatc accatcacca 50

t 51

<210> 127
<211> 54
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35
<223> unknown base

<400> 127

ttcacctcga aagcaagcnn snnsnnsnns nnsnnscacc atcaccatca 50

ccat 54

<210> 128
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35
<223> unknown base

<400> 128
ttcacctcga aagcaagcnn snnsnnsnns nnsnnsvvcv vccaccatca 50

ccatcaccat 60

<210> 129
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35
<223> unknown base

<400> 129
ttcacctcga aagcaagcnn snnsnnsnns nnsnnsvvcv vcvvcvvcca 50

ccatcaccat caccat 66

<210> 130
<211> 75
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35
<223> unknown base

<400> 130
ctgcgtaata aggagtctnn snnsnnsnns nnsnnscacc atcaccatca 50

ccattaatca tgccagttct tttgg 75

<210> 131
<211> 81
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41
<223> unknown base

<400> 131
ctgcgtaata aggagtctnn snnsnnsnns nnsnnsnnsn nscaccatca 50

ccatcaccat taatcatgcc agttcttttg g 81

<210> 132
<211> 87
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44,
46-47
<223> unknown base

<400> 132
ctgcgtaata aggagtctnn snnsnnsnns nnsnnsnnsn nsnnsnnsca 50

ccatcaccat caccattaat catgccagtt cttttgg 87

<210> 133
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 133
gggcaggcca ggatcgtcta ccggcagaag 30

<210> 134
<211> 10
<212> PRT

<213> Artificial sequence

<220>
<223> peptide linker

<400> 134
Gly Gln Ala Arg Ile Val Tyr Arg Gln Lys
1 5 10

<210> 135
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 135
aggatcaggg tcctgcagaa gggcaaggag 30

<210> 136
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> peptide linker

<400> 136
Arg Ile Arg Val Leu Gln Lys Gly Lys Glu
1 5 10

<210> 137
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 137
cgcgccaaga tcgagcagat ctgcaaggag 30

<210> 138
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> peptide linker

<400> 138
Arg Ala Lys Ile Glu Gln Ile Cys Lys Glu
1 5 10

<210> 139
<211> 27
<212> DNA
<213> Artificial sequence

<220>
<223> M13 coat protein VIII fragment oligonucleotide library

<220>
<221> unsure
<222> 2, 4, 8, 10, 13, 17, 20, 23, 26
<223> unknown base

<400> 139
rntnasrntn asnycrntrn arntrnt 27

<210> 140
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 wt coat protein VIII fragment oligonucleotide

<400> 140
gccgagggtg acgatcccgc aaaagcggcc 30

<210> 141
<211> 10
<212> PRT
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<220>
<223> M13 wt coat protein VIII fragment

<400> 141
Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala
1 5 10

<210> 142
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 142
gataagagtg agaagttcgc tagagatgct 30

<210> 143
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 143
Asp Lys Ser Glu Lys Phe Ala Arg Asp Ala
1 5 10

<210> 144
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 144
aataaggatg agcagttcgc tagagctgct 30

<210> 145
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 145
Ile Lys Asp Glu Gly Phe Ala Arg Ala Ala
1 5 10

<210> 146
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 146
atttacatta aggagaccag taaaaatgct 30

<210> 147
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 147
Ile Tyr Ile Lys Glu Thr Ser Lys Asn Ala
1 5 10

<210> 148
<211> 30

<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 148
aattacgttg accaggtcag taaaaatgct 30

<210> 149
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 149
Asn Tyr Val Asp Gln Val Ser Lys Asn Ala
1 5 10

<210> 150
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 150
gctaaggctg aggagttcgc tgaagctgct 30

<210> 151
<211> 10
<212> PRT
<213> Artificial sequence

<220>
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<400> 151
Ala Lys Ala Glu Glu Phe Ala Glu Ala Ala
1 5 10

<210> 152
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 152
gctgacattg acgacttcgc tagaagtgct 30

<210> 153
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 153
Ala Asp Ile Asp Asp Phe Ala Arg Ser Ala
1 5 10

<210> 154
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 coat protein VIII fragment oligonucleotide library

<220>
<221> unsure
<222> 1, 4, 8, 10, 13, 17, 20, 23, 26, 28
<223> unknown base

<400> 154
nwtnasrntn ytnasrntrn trntrntnas 30

<210> 155
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 wt coat protein VIII fragment oligonucleotide

<400> 155
tttaactccc tgcaagcctc agcgaccgaa 30

<210> 156
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 wt coat protein VIII fragment

<400> 156
Phe Asn Ser Leu Gln Ala Ser Ala Thr Glu
1 5 10

<210> 157
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 157
tatgaggctc ttgaggatat tgctactaac 30

<210> 158
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 158
Tyr Glu Ala Leu Glu Asp Ile Ala Thr Asn
1 5 10

<210> 159
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 159
tatgaggctc ttgaggatat tgctactaac 30

<210> 160
<211> 10
<212> PRT
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<220>
<223> M13 variant coat protein VIII fragment

<400> 160
Tyr Glu Ala Leu Glu Asp Ile Ala Thr Asn
1 5 10

<210> 161
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 161
tatgaggctc ttgaggatat tgctactaac 30

<210> 162
<211> 10

<212> PRT
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<220>
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<400> 162
Tyr Glu Ala Leu Glu Asp Ile Ala Thr Asn
1 5 10

<210> 163
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 163
tatgacgttc ttcagattgc tgctattaac 30

<210> 164
<211> 10
<212> PRT
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<220>
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<400> 164
Tyr Asp Val Leu Gln Ile Ala Ala Ile Asn
1 5 10

<210> 165
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 165
cttaaggatc ttaaggctac tgttattcag 30

<210> 166
<211> 10
<212> PRT
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<220>
<223> M13 variant coat protein VIII fragment

<400> 166
Leu Lys Asp Leu Lys Ala Thr Val Ile Gln
1 5 10

<210> 167
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 167
tatgagacta ttaaggatga tattgttaag 30

<210> 168
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 168
Tyr Glu Thr Ile Lys Asp Asp Ile Val Lys
1 5 10

<210> 169
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 169
cttcagaata ttcacagtag tattagtaag 30

<210> 170
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 170
Leu Gln Asn Ile His Ser Ser Ile Ser Lys
1 5 10

<210> 171
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 171
tataagactg ttcagggtgc tattgctaag 30

<210> 172
<211> 10
<212> PRT
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<220>
<223> M13 variant coat protein VIII fragment

<400> 172
Tyr Lys Thr Val Gln Gly Ala Ile Ala Lys
1 5 10

<210> 173
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 173
tataagacta ttaagagtat tgctaataag 30

<210> 174
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 174
Tyr Lys Thr Ile Lys Ser Ile Ala Asn Lys
1 5 10

<210> 175
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 175
tattagagtc ttcagattat tgctgctcag 30

<210> 176
<211> 10
<212> PRT
<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment

<400> 176
Tyr Gln Ser Leu Gln Ile Ile Ala Ala Gln
1 5 10

<210> 177
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 177
tttcagagtc ttaaggatac tgctgatgag 30

<210> 178
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 178
Phe Gln Ser Leu Lys Asp Thr Ala Asp Glu
1 5 10

<210> 179
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 179
tttgagaatc tttaggctac tattactaag 30

<210> 180
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 180
Phe Glu Asn Leu Gln Ala Thr Ile Thr Lys
1 5 10

<210> 181
<211> 30
<212> DNA

<213> Artificial sequence

<220>
<223> M13 coat protein VIII fragment oligonucleotide library

<220>
<221> unsure
<222> 1, 4, 7, 10, 13, 16, 19, 22, 25, 28
<223> unknown base

<400> 181
nwcnwcnktn wcnytnkgny tnkgnwtnwt 30

<210> 182
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 wt coat protein VIII fragment oligonucleotide

<400> 182
tatatcggtt atcgctgggc gatggttgtt 30

<210> 183
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 wt coat protein VIII fragment

<400> 183
Tyr Ile Gly Tyr Ala Trp Ala Met Val Val
1 5 10

<210> 184
<211> 30
<212> DNA
<213> Artificial sequence

<220>
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<400> 184
cttttctttc tccttgggac tgtgcatctt 30

<210> 185
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 185
Leu Phe Phe Leu Leu Gly Thr Val His Leu
1 5 10

<210> 186
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 186
tactaccttа acattttggc tgtgtatgtt 30

<210> 187
<211> 10
<212> PRT
<213> Artificial sequence

<220>
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<400> 188
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<220>
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<400> 189
Phe Ile Arg Val Thr Trp Thr Met Tyr Val
1 5 10

<210> 190
<211> 30
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<220>
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<400> 190
gtcatccgtt acgttatgtc tatgtatgtt 30

<210> 191
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<400> 191
Val Ile Arg Tyr Val Met Ser Met Tyr Val
1 5 10

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<400> 192
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<210> 193
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<400> 193
Asp Gly Ser Asn Ser Thr His Pro His Arg His Asn Arg Arg
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<210> 194
<211> 42
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<220>
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<400> 194
accgcccgcc acgccaacga caacgacggc gcccaccgcc cc 42

<210> 195
<211> 14
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<400> 195
Thr Ala Arg His Ala Asn Asp Asn Asp Gly Ala His Arg Pro
1 5 10

<210> 196
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<220>
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<400> 196
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<210> 197
<211> 14
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Thr His Pro Asn Pro Arg Asn Ala Ala Gly Pro Ala Pro Gly
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<220>
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<400> 198
caccgcaacg gcaccgaccc cggcggcccc cgcgcccgcc ac 42

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1 5 10

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<220>
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<400> 202
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<210> 203
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<220>
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Pro Arg Ser Ala Arg Ser Arg Asn Thr Asn Asp Arg His Asp
1 5 10

<210> 204
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<220>
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<400> 204

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<210> 205
<211> 14
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<220>
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<400> 205
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1 5 10

<210> 206
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<220>
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<400> 206
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<210> 207
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<220>
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1 5 10

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<400> 208
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<210> 209
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<220>
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<400> 209
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1 5 10

<210> 210
<211> 15
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<220>
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<400> 210
gcccgcgcca accgc 15

<210> 211
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<220>
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<400> 211
Ala Arg Ala Asn Arg
1 5

<210> 212
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<220>
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<400> 212
cgccacaacc gccgc 15

<210> 213
<211> 5
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<220>
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<400> 213
Arg His Asn Arg Arg
1 5

<210> 214
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<220>
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<400> 214
gaccacagca gcgcc 15

<210> 215
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<220>
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<400> 215
Asp His Ser Ser Ala
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<210> 216
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<220>
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<400> 216
gcccgcggcc ccacc 15

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<220>
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<400> 217
Ala Arg Gly Pro Thr
1 5

<210> 218
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<220>
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<400> 218
cacacccccg gcgcc 15

<210> 219
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<212> PRT
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<220>
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<400> 219
His Thr Pro Gly Ala
1 5

<210> 220
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<220>
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<400> 220
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<210> 221
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<220>
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<400> 221
Asn Ser Gly Gly Asp
1 5

<210> 222
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<220>
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<400> 222
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<210> 223
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<220>
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<400> 223
Arg Thr Thr Ser Asn
1 5

<210> 224
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<400> 224
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<400> 225
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1 5 10

<210> 226
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<220>
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<400> 226
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<210> 227
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<220>
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<400> 227
Ala Asn Ser His Ala Ala His Gly Thr Ser
1 5 10

<210> 228
<211> 30
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<220>
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<400> 228
accccggcc acggccaccc ccaccccgac 30

<210> 229
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<220>
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<400> 229
Thr Pro Gly His Gly His Pro His Pro Asp
1 5 10

<210> 230
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<400> 230
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<210> 231
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<400> 231
Arg Gly Gly Arg Ala Pro His Ser Ser Ala
1 5 10

<210> 232
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<220>
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<400> 232
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<210> 233
<211> 10
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<220>

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<400> 233
Ala Gly Arg Gly Thr Ser Ser Thr Arg Gly
1 5 10

<210> 234
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<400> 234
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<210> 235
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<400> 235
Pro Arg His Asp His His Pro Ala His Asp
1 5 10

<210> 236
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<400> 236
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<400> 237
Asp Arg Gly Arg Thr Asn Arg Thr Asp Thr
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<210> 238
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<400> 238
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<210> 239
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<400> 239
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1 5 10 15

<210> 240
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<210> 241
<211> 15
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<220>
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<400> 241
His Ala Gly Ala Asp Ala Asp Arg Ser Ser Asn Thr Asp Asp Gly
1 5 10 15

<210> 242
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<212> DNA
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<400> 242
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<210> 243

<211> 15
<212> PRT
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<400> 243
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1 5 10 15

<210> 244
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<220>
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<400> 244
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<210> 245
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<212> PRT
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<400> 245
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1 5 10 15

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<212> DNA
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<400> 246
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<210> 247
<211> 15
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<400> 247
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1 5 10 15

<210> 248
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<212> DNA
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<400> 248
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<210> 249
<211> 15
<212> PRT
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<220>
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<400> 249
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1 5 10 15

<210> 250
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<212> DNA
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<220>
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<400> 250
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cgccgccaac 60

<210> 251
<211> 20
<212> PRT
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<220>
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<400> 251
Ser Ala Gly Ser Asp Ser Ala Arg His Thr Ala Pro Arg Ser Pro
1 5 10 15

Ala Ser Ala Ala Asn
20

<210> 252
<211> 60

<212> DNA
<213> Artificial sequence

<220>
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<400> 252
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cggcaccggc 60

<210> 253
<211> 20
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<220>
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<400> 253
Ala Pro Ser Ser Ala Gly Asn Asp Pro Asp Arg Ser Arg Ser Asp
1 5 10 15

Ala Arg Gly Thr Gly
20

<210> 254
<211> 60
<212> DNA
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<220>
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<400> 254
gacggcagcc ccaacggcgg ccgcggccac aacgacaacc ccccccgcgg 50

ccacgccccc 60

<210> 255
<211> 20
<212> PRT
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<220>
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<400> 255
Asp Gly Ser Pro Asn Gly Gly Arg Gly His Asn Asp Asn Pro Pro
1 5 10 15

Arg Gly His Ala Pro
20

<210> 256

<211> 60
<212> DNA
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<220>
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<400> 256
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caccgccagc 60

<210> 257
<211> 20
<212> PRT
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<220>
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<400> 257
Ser Ala Ser Ala Asp Ser Ser Arg Thr Ala Ala Arg Pro Pro Gly
1 5 10 15

Pro Gly Thr Ala Ser
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<210> 258
<211> 60
<212> DNA
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<220>
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<400> 258
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cggcagccac 60

<210> 259
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<220>
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<400> 259
Arg Ser Ala Ala Gly Arg Asp Ala Gly Arg Asp Arg Pro Ala Gly
1 5 10 15

Ser Ser Gly Ser His
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<210> 260
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<212> DNA
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<220>
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cagcggcccc 60

<210> 261
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<220>
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Ser Gly Ser Pro Ala Asn Ala Pro Gly His His Ser His His Asp
1 5 10 15

Ala Arg Ser Gly Pro
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<210> 262
<211> 75
<212> DNA
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<220>
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<400> 262
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cagcaacggc agcgacagca gcagc 75

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<220>
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1 5 10 15

Arg Gly Ser Asn Gly Ser Asp Ser Ser Ser
20 25

<210> 264
<211> 75
<212> DNA
<213> Artificial sequence

<220>
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<400> 264
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cccccacggc cacagcagcc cccgc 75

<210> 265
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<220>
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1 5 10 15

Asp Gly Pro His Gly His Ser Ser Pro Arg
20 25

<210> 266
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52, 55
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tnwtnwt 57

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tattgtt 57

<210> 268
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<220>
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<400> 268
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1 5 10 15

Val Gly Ile Val

<210> 269
<211> 57
<212> DNA
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<220>
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<400> 269
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ttatgtt 57

<210> 270
<211> 19
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<220>
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<400> 270
His Ser Leu Ala Val Ile Asp Asp Asn Phe Tyr Trp Val Gly Phe
1 5 10 15

Tyr Gly Tyr Val

<210> 271
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<400> 271
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tcttgtt 57

<210> 272
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<400> 272
Leu Phe Tyr Pro Val Ser Val His Ile Val Ile Arg Phe Leu Ser
1 5 10 15

Leu Phe Leu Val

<210> 273
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<400> 273
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tgttaat 57

<210> 274
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<220>
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<400> 274
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1 5 10 15

His Val Val Asn

<210> 275
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<400> 275
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ttttgat 57

<210> 276
<211> 19
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<220>
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<400> 276
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1 5 10 15

Asn Ser Phe Asp

<210> 277
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<400> 277
tattttcttg cttttagtat tattgatctt tttaggcttt ggctttactt 50

tgttaat 57

<210> 278
<211> 19
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<220>
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1 5 10 15

Tyr Phe Val Asn

<210> 279
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<400> 279
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<210> 280
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<220>
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<400> 280
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1 5

<210> 281
<211> 9
<212> PRT
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<220>
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Ala Ala His His His His His His Ala
1 5

<210> 282
<211> 9
<212> PRT
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<220>
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<400> 282
Lys Leu Phe Lys Lys Phe Thr Ser Lys
1 5

<210> 283
<211> 9
<212> PRT
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<400> 283
Lys Ser Thr Phe Lys Lys Phe Leu Lys

1 5

<210> 284
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Glu Thr Ala Ser Ala Gln Leu Ser Asn Ser Ala Ala Lys Ala Pro
1 5 10 15

Asp Asp Gly Glu Ala
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<210> 285
<211> 20
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<220>
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<400> 285
Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asn Ser Leu Gln
1 5 10 15

Ala Ser Ala Thr Glu
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<210> 286
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Ala Ala Asp Ala
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<210> 287
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<400> 287
His His His His His His
1 5